

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: N. KOBAYASHI et al.
Serial No.: Not Yet Assigned
Continuation of Application Serial No.
09/185,097
Filed: Even Date Herewith
For: DIGITAL MAGNETIC RECORDING/REPRODUCING
APPARATUS
Art Unit: 2634 (Anticipated)
Examiner: C. Fan (Anticipated)

PRELIMINARY REMARKS

Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

June 25, 2001

Sir:

The following remarks are being submitted prior to
examination in connection with the above-identified
application submitted herewith.

REMARKS

Claim 1 is pending, and is independent.

Submitted herewith is a claim for priority,
acknowledgement of which is respectfully requested.

Submitted herewith is an Information Disclosure
Statement, consideration of which is respectfully requested.

Claim 1 of the present continuation application is a
revised version of original claim 1 of application Serial No.

09/185,097 filed on November 3, 1998, the parent application of the present continuation application.

Original claim 1 of the parent application reads as follows:

1. A digital magnetic recording/reproducing apparatus for recording and reproducing digital information comprising:

Viterbi detection means for decoding a signal sequence obtained by partial response equalization, and simultaneously producing n candidates of best data, second best data, third best data, ... , nth best data; and

means for detecting error in each of said data sequences, and selecting/producing sequences with no error as correct decoded results.

In an Office Action dated September 13, 2000, issued in the parent application, Examiner Paul N. Rupert, the original Examiner of the parent application, rejected original claim 1 of the parent application under 35 USC 103(a) as being unpatentable over Stenström et al. (U.S. Patent No. 5,822,340) (Stenström) in view of Y. Lin et al., "A Generalized Viterbi Algorithm for Detection of Partial Response Recording Systems", IEEE Transactions on Magnetics, Vol. 32, No. 5, September 1996, pp. 3983-3985 (Lin), with the Examiner improperly relying on J. Lee et al., "An Advanced Winchester Disk Controller", Proceedings of Technical Papers, 1989 International Symposium on VLSI Technology, Systems and Applications, May 17-19, 1989, Taipei, Taiwan, pp. 376-379, published by IEEE, 1989 (Lee), in support of the rejection without including Lee in the statement of the rejection as

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required by MPEP 706.02(j) (Seventh Edition, Revision 1, February 2000) referring to footnote 3 in the decision of In re Hoch, 428 F.2d 1341, 1342 n.3, 166 USPQ 406, 407 n. 3 (CCPA 1970). Stenström, Lin, and Lee are cited in the accompanying Information Disclosure Statement. Although this rejection was rendered moot by the cancellation of original claim 1 of the parent application in an amendment filed on December 13, 2000, in the parent application, the rejection is respectfully traversed insofar as it may be deemed to be applicable to claim 1 of the present continuation application.

Independent claim 1 of the present continuation application recites a digital magnetic recording/reproducing apparatus for recording and reproducing digital information comprising a Viterbi decoder which decodes a signal sequence obtained by partial response equalization and produces n candidates of a decoded result, the n candidates being a best candidate to an nth best candidate and being produced simultaneously by the Viterbi decoder, and a selector which detects errors in the n candidates, and selects a candidate having no detected errors from the n candidates as a correct decoded result.

In explaining the rejection of original claim 1 of the parent application in the Office Action of September 13, 2000, issued in the parent application, Examiner Rupert stated as follows:

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stenström et al. (US 5822340) and Yinyi Lin and Char-Yuan Yeh; "A Generalized

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Viterbi Algorithm for Detection of Partial Response Recording Systems", Magnetics, IEEE Transactions on, Vol. 32 5 1, Sept. 1996, pp. 3983-3985.

What is claimed is digital magnetic recording apparatus comprising a Viterbi detector for decoding a signal sequence obtained by partial response equalization, which simultaneously produces n best candidates of correctly decoded data sequences, and a means for detecting an error in the candidate data sequences and selecting only a candidate data sequence with no error. Lin et al. disclose the use of a Viterbi detector in a high density partial response recording system, as claimed (a computer hard disk drive is such a system). Lin et al further propose to use the Generalized Viterbi Algorithm (GVA) which presents as output a set of n best candidate data sequences, as claimed. Lin et al. does not discuss an error detecting means for selecting only a candidate sequence with no error but in the field of high density magnetic recording the use of error detecting and correcting codes such as CRC codes (cyclic redundancy check) is long known and practiced (ref. Jiin Lee, Tzong-Dar Her, Chun-Mei Lin, Po-Chuan Huang, Tain-Rein Chen and Jun-Wei Jan "An Advanced Winchester Disk Controller" VLSI Technology, Systems and Applications, 1989. Proc. of Tech. Papers. 1989 Int Symposium on, 1989, pp 376-379). Stenström discloses that a CRC can be used to select a candidate sequence from a set of candidate sequences produced by a GVA (col. 2 lines 35-42). It would have been obvious to one of ordinary skill in the art to select from the candidate data sequences produced by the GVA application proposed by Lin et al by means of the CRC block code employed on hard disk drives in order to select for output the candidate data sequence which had no error.

At the outset, it is submitted that the rejection of original claim 1 of the parent application set forth in the Office Action of September 13, 2000, issued in the parent

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application was improper because Examiner Rupert did not include Lee relied on by the Examiner to support the rejection in the statement of the rejection as required by MPEP 706.02(j) (Seventh Edition, Revision 1, February 2000) referring to footnote 3 in the decision of In re Hoch, 428 F.2d 1341, 1342 n.3, 166 USPQ 406, 407 n. 3 (CCPA 1970) and stating as follows in pertinent part:

Where a reference is relied to support a rejection, whether or not in a minor capacity, that reference should be positively included in the statement of the rejection. See In re Hoch, 428 F.2d 1341, 1342 n.3 166 USPQ 406, 407 n. 3 (CCPA 1970).

Footnote 3 of Hoch reads in pertinent part (emphasis added):

Where a reference is relied on to support a rejection, whether or not in a "minor capacity," there would appear to be no excuse for not positively including the reference in the statement of rejection. (Emphasis added).

Since Examiner Rupert did not include Lee relied by the Examiner to support the rejection of original claim 1 of the parent application in the statement of the rejection of original claim 1 of the parent application as required by Hoch and MPEP 706.02(j), it is submitted that the rejection of original claim 1 of the parent application set forth in the Office Action of September 13, 2000, issued in the parent application was improper, and that the Examiner did not establish a prima facie case of obviousness under 35 USC 103(a) with respect to original claim 1 of the parent application.

Furthermore, it is submitted that Stenström, Lin, and Lee do not disclose or suggest the feature of claim 1 of the present continuation application wherein the n candidates of a decoded result are produced simultaneously by the Viterbi decoder. Although both Stenström and Lin appear to disclose a Viterbi decoder which produces n candidates of a decoded result as recited in claim 1 of the present continuation application, it is not seen where Stenström and Lin disclose or suggest that the n candidates of a decoded result are produced simultaneously by the Viterbi decoder as recited in claim 1 of the present continuation application.

Original claim 1 of the parent application recited a similar feature, i.e. Viterbi detection means for decoding a signal sequence obtained by partial response equalization, and simultaneously producing n candidates of best data, second best data, third best data, ..., nth best data. However, Examiner Rupert of the parent application did not explain where he considered the feature of original claim 1 wherein the Viterbi detection means simultaneously produces n candidates to be disclosed or suggested by Stenström, Lin, and Lee in explaining the rejection of original claim 1 of the parent application in the Office Action of September 13, 2000, issued in the parent application, wherein Examiner Rupert stated as follows with respect to Lin in pertinent part:

Lin et al further propose to use the Generalized Viterbi Algorithm (GVA) which presents as output a set of n best candidate data sequences, as claimed.

and stated as follows with respect to Stenström:

Stenström discloses that a CRC can be used to select a candidate sequence from a set of candidate sequences produced by a GVA (col. 2 lines 35-42).

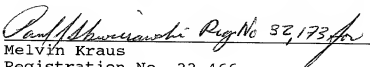
Accordingly, for the reasons discussed above, it is submitted that Stenström, Lin, and Lee do not disclose or suggest the feature of claim 1 of the present continuation application wherein the n candidates of a decoded result are produced simultaneously by the Viterbi decoder.

Since Stenström, Lin, and Lee do not disclose or suggest the feature of independent claim 1 of the present continuation application discussed above, it is submitted that independent claim 1 of the present continuation application patentably distinguishes over Stenström, Lin, and Lee in the sense of 35 USC 103(a), and an indication to that effect is respectfully requested.

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Respectfully submitted,

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